



Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A polymeric composition having antimicrobial properties, the polymeric composition comprising: a crosslinked chemical combination of (i) a polymer having side chains along a backbone forming the polymer, at least two of the side chains containing an amino group, (ii) an antimicrobial agent selected from the group consisting of metals, metal alloys, metal salts, metal complexes and mixtures thereof, and (iii) a crosslinking agent containing at least two functional groups capable of reacting with the amino groups;

wherein the polymer is a polyamide, and the polyamide is synthesized by (i) reacting a monomer selected from the group consisting of unsaturated carboxylic acids, esters of unsaturated carboxylic acids, anhydrides of unsaturated carboxylic acids, and mixtures thereof, and a first amine to form an intermediate reaction product, wherein the first amine is selected from the group consisting of RR_1NH , RNH_2 , polyalkylene polyamines and mixtures thereof, and (ii) reacting the intermediate reaction product and a second amine to form the polyamide, wherein the second amine is selected from the group consisting of R_2R_3NH , R_2NH_2 , polyalkylene polyamines and mixtures thereof, wherein R , R_1 , R_2 and R_3 are the same or different and each R , R_1 , R_2 and R_3 contains between 1 and 50 carbon atoms and is optionally substituted with heteroatoms oxygen, nitrogen, sulfur, phosphorus, or combinations thereof; and at least one of the selected amines includes at least two amino groups.

2. (Cancelled)

3. (Currently Amended) The polymeric composition of claim 2 1 wherein R and R_1 are alkyl.

4. (Currently Amended) The polymeric composition of claim 3 wherein the first amine is comprises tetradecylamine.

5. (Currently Amended) The polymeric composition of claim 2 1 wherein the second amine is comprises a polyalkylene polyamine.

6. (Currently Amended) The polymeric composition of claim 5 wherein the polyalkylene polyamine is comprises pentaethylenehexamine.

7. (Currently Amended) The polymeric composition of claim 2 1 wherein the monomer is selected from the group consisting of unsaturated dicarboxylic acids, esters of unsaturated dicarboxylic acids, anhydrides of unsaturated dicarboxylic acids, and mixtures thereof.

8. (Previously Presented) The polymeric composition of claim 7 wherein the monomer is selected from the group consisting of maleic anhydride, maleic acid esters, and mixtures thereof.

9. (Currently Amended) The polymeric composition of claim 2 1 wherein the antimicrobial agent is selected from the group consisting of chelated silver ions, silver metal, chelated copper ions, copper metal, chelated zinc ions, zinc metal and mixtures thereof.

10. (Cancelled)

11. (Currently Amended) The polymeric composition of claim ~~10~~ 1 wherein the monomer comprises a maleic acid ester ~~R and R1 are alkyl.~~

12. (Currently Amended) The polymeric composition of claim ~~11~~ 8 wherein the first amine comprises ~~is~~ tetradecylamine.

13. (Currently Amended) The polymeric composition of claim ~~10~~ 8 wherein the second amine comprises ~~is~~ a polyalkylene polyamine.

14. (Currently Amended) The polymeric composition of claim 13 wherein the polyalkylene polyamine comprises ~~is~~ pentaethylenehexamine.

15. (Currently Amended) The polymeric composition of claim ~~10~~ 1 wherein the monomer comprises maleic anhydride ~~lactone is 2(5H)-furanone.~~

16. (Currently Amended) The polymeric composition of claim ~~4~~ 7 wherein the antimicrobial agent is selected from the group consisting of chelated silver ions, silver metal, chelated copper ions, copper metal, chelated zinc ions, zinc metal and mixtures thereof.

17. (Previously Presented) The polymeric composition of claim 1 wherein the crosslinking agent is selected from the group consisting of phosphines having the formula $(A)_3P$, wherein A is hydroxyalkyl, and mixtures thereof.

18. (Previously Presented) The polymeric composition of claim 17 wherein the crosslinking agent is tris(hydroxymethyl)phosphine.

19. (Currently Amended) The polymeric composition of claim ~~4~~ 8 wherein the antimicrobial agent is selected from the group consisting of chelated silver ions, silver metal, chelated copper ions, copper metal, chelated zinc ions, zinc metal and mixtures thereof.

20. (Withdrawn) The polymeric composition of claim 1, further comprising a second crosslinked chemical combination of (i) a second polymer having side chains along a backbone forming the second polymer, at least two of the side chains containing an amino group, (ii) a second antimicrobial agent selected from the group consisting of metals, metal alloys, metal salts, metal complexes and mixtures thereof, and (iii) a second crosslinking agent containing at least two functional groups capable of reacting with the amino groups, wherein the antimicrobial agent and the second antimicrobial agent are different.

21. (Currently Amended) The polymeric composition of claim 20 wherein: the polymer and the second polymer are a polyamide, and the polyamide is synthesized by reacting a monomer selected from the group consisting of unsaturated carboxylic acids, esters of unsaturated carboxylic acids, anhydrides of unsaturated carboxylic acids, and mixtures thereof, and an amine, wherein the amine is selected from the group consisting of RR_1NH , RNH_2 , polyalkylene polyamines $RR_1NH_2^+$, RNH_3^+ and mixtures thereof, wherein the R and R_1 groups can be are the same or different and each contain between about 1 and 50 carbon atoms and are optionally substituted with heteroatoms oxygen, nitrogen, sulfur, and phosphorus and combinations thereof, wherein at least one of the selected amines includes at least two amino groups ~~one or more of R and R_1 are substituted with an amino group.~~

22. (Withdrawn) The polymeric composition of claim 20 wherein: the crosslinking agent and the second crosslinking agent are selected from the group consisting of phosphines having the formula $(A)_3P$, wherein A is hydroxyalkyl, and mixtures thereof.

23. (Withdrawn) The polymeric composition of claim 20 wherein: the antimicrobial agent is selected from the group consisting of chelated copper ions, copper metal, and mixtures thereof, and the second antimicrobial is selected from the group consisting of chelated silver ions, silver metal, and mixtures thereof.

24. (Withdrawn) The polymeric composition of claim 20 wherein: the antimicrobial agent is selected from the group consisting of chelated copper ions, copper metal, and mixtures thereof, and the second antimicrobial is selected from the group consisting of chelated zinc ions, zinc metal, and mixtures thereof.

25.-44. (Cancelled)

45. (Currently Amended) A polyamide material comprising:

(A) a crosslinked polymeric material formed by a process comprising:

(i) reacting a reaction mixture comprising a monomer selected from the group consisting of maleic anhydride, maleic acid esters, and mixtures thereof, and one or more amines selected from polyalkylene polyamines and amines having the formula R-NH₂ to form an intermediate reaction product, wherein the R group contains between 1 and 50 carbon atoms and is optionally substituted with heteroatoms oxygen, nitrogen, sulfur, phosphorus, and combinations thereof; wherein at least one of the selected amines includes at least two amino groups ~~one amine has an R group substituted with an amino group~~; and

(ii) reacting the intermediate reaction product and the one or more amines to form a polyamide; and

(iii) reacting the polyamide with a crosslinking agent to form a crosslinked polymer, wherein the crosslinking agent includes at least two functional groups capable of reacting with amino groups; and

(B) copper ions, copper metal, or a mixture thereof.

46. (Cancelled)

47. (Currently Amended) A polyamide material comprising:

(A) a polymer formed by a process comprising:

(i) reacting a reaction mixture comprising a monomer selected from the group consisting of unsaturated carboxylic acids, esters of unsaturated carboxylic acids, anhydrides of unsaturated carboxylic acids, and mixtures thereof, and one or more amines selected from polyalkylene polyamines and amines having the formula $R-NH_2$ to form an intermediate reaction product, wherein the R group contains between 1 and 50 carbon atoms and is optionally substituted with heteroatoms oxygen, nitrogen, sulfur, phosphorus, and combinations thereof, wherein at least one of the selected amines includes at least two amino groups ~~one amine has an R-group substituted with an amino group~~; and

(ii) reacting the intermediate reaction product and the one or more amines to form a polyamide; and

(B) an antimicrobial agent selected from the group consisting of a metal, a metal alloy, a metal salt, a metal complex, and mixtures thereof.

48. (Cancelled)

49. (Currently Amended) A polyamide material comprising:

(A) a crosslinked polymeric material formed by a process comprising:

(i) reacting a reaction mixture comprising a monomer selected from the group consisting of unsaturated carboxylic acids, esters of unsaturated carboxylic acids, anhydrides of unsaturated carboxylic acids, and mixtures thereof, and one or more amines selected from polyalkylene polyamines and amines having the formula $R-NH_2$ to form an intermediate reaction product, wherein the R group contains between 1 and 50 carbon atoms and is optionally substituted with heteroatoms oxygen, nitrogen, sulfur, phosphorus, and combinations thereof, wherein at least one of the selected amines includes at least two amino groups ~~one amine has an R-group substituted with at least one amino group~~; and

(ii) reacting the intermediate reaction product and the one or more amines to form a polyamide; and

(iii) reacting the polyamide with a crosslinking agent to form a crosslinked polymer, wherein the crosslinking agent includes at least two functional groups capable of reacting with amino groups; and

(B) an antimicrobial agent selected from the group consisting of a metal, a metal alloy, a metal salt, a metal complex, ~~or~~ and mixtures thereof.

50. (Currently Amended) The polyamide material of claim 49 wherein the monomer comprises at least one unsaturated carboxylic monomer selected from the group consisting of maleic anhydride, maleic acid esters, ~~or~~ and mixtures thereof.

51. (Previously Presented) The polyamide material of claim 49 wherein the antimicrobial agent includes chelated silver ions, silver metal, chelated copper ions, copper metal, chelated zinc ions, zinc metal, or mixtures thereof.

52. (Cancelled)

53. (Currently Amended) A crosslinked polymeric material formed from:

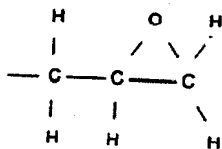
(A) a polyamide formed from a mixture which comprises:

(i) one or more monomers selected from the group consisting of maleic anhydride, maleic acid esters, and mixtures thereof; and

(ii) one or more amines selected from the group consisting of R-NH₂, a polyalkylene polyamine, and mixtures thereof, wherein the R group R-NH₂ and the polyalkylene polyamine each contain contains between 1 and 50 carbon atoms and are is optionally substituted with heteroatoms oxygen, nitrogen, sulfur, phosphorus, or combinations thereof; thereof; wherein one or more of the selected amines includes at least two amino groups is substituted with an amino group;

(B) one or more antimicrobial agents selected from the group consisting of metals, metal alloys, metal salts, metal complexes and mixtures thereof; and

(C) one or more crosslinking agents selected from the group consisting of aliphatic isocyanate compounds having 2 or more -N=C=O groups; aromatic isocyanate compounds having 2 or more -N=C=O groups; aliphatic aldehyde compounds having 2 or more -CHO groups; aromatic aldehyde compounds having 2 or more -CHO groups; phosphines having the general formula (A)₂P(B) wherein A is hydroxyalkyl, and B is hydroxyalkyl, alkyl, or aryl; epoxy resins having end groups of the formula:



, and mixtures thereof.

54. (Previously Presented) The crosslinked polymeric material of claim 53, wherein the monomer comprises maleic anhydride mono-ethyl ester.

55. (Previously Presented) The crosslinked polymeric material of claim 53, wherein the one or more amines comprise tetradecylamine.
56. (Previously Presented) The crosslinked polymeric material of claim 53, wherein the one or more amines comprise pentaethylenehexamine.
57. (Withdrawn) The crosslinked polymeric material of claim 53, wherein the one or more antimicrobial agents comprise chelated silver ions, silver metal, or a mixture thereof.
58. (Previously Presented) The crosslinked polymeric material of claim 53, wherein the one or more antimicrobial agents comprise chelated copper ions, copper metal, or a mixture thereof.
59. (Withdrawn) The crosslinked polyamide material of claim 53, wherein the one or more crosslinking agents comprise glutaraldehyde.
60. (Currently Amended) The crosslinked polymeric material of claim 53, wherein the one or more crosslinking agents comprise a phosphine formed from the reaction of tetrakis(hydroxymethyl)phosphonium chloride and ~~trimethylamine~~ triethylamine.
61. (Withdrawn) The crosslinked polymeric material of claim 53, wherein the one or more crosslinking agents comprise tris(hydroxymethyl)phosphine.
62. (Currently Amended) The polyamide material of claim 45, wherein the selected amines ~~one or more amines~~ comprise tetradecylamine and pentaethylenehexamine.